Environnement Canada
Région du Québec

Environment Canada
Québec Region

Guide for impact assessment on birds

Environmental Assessment Division
and
Canadian Wildlife Service

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Canada

Project Team

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Introduction

104-06194/

Every year, some 300 species of birds find suitable breeding habitat in Quebec. Most are migratory species that overwinter further south, in the United States, Mexico, Central America and even South America. Migratory birds are therefore a shared resource for which we have made international conservation commitments. The *Migratory Birds Convention*, the *Migratory Birds Convention Act* and the Regulations made under the Act are among the various mechanisms adopted by countries interested in contributing to the joint effort to protect this resource.

The extinction of several species over the past century and the accelerated decline of others have spurred efforts aimed at halting the loss in bird diversity in the Americas. It is widely recognized that this decline is largely due to habitat destruction and modification.

Every human activity which results in habitat destruction or modification contributes either directly or indirectly to the decline of certain species. More than ever before, environmental assessment is a key tool for minimizing the impacts of development projects on birds and for ensuring that we meet our commitments to the countries with which we share this resource.

All too often, however, efforts aimed at assessing the environmental impacts of projects on birds fall far short of what is required to ensure informed decision-making. This is due to difficulties accessing available data and to the technical constraints inherent in the collection of field data, among other factors.

In the following pages, we propose a structured approach for properly assessing the environmental impacts of projects on birds. This document is intended to serve as a guide and provides useful references and information on existing data and expertise. Readers are invited to proceed step by step and to address the main points to be considered in such an exercise.

We believe that a serious discussion of bird resources in environmental assessments will produce tangible environmental benefits.

For further information, please contact the Environmental Assessment Division of Environment Canada at (418) 648-7025.

Layout of the Guide

The guide is structured as follows:

- A series of 7 data sheets, one for each step. Each data sheet is divided into several themes and sets out various actions. The right hand column provides the relevant appendices and bibliographical references.
- A series of appendices containing information which is often necessary and usually difficult to access.
- A collection of bibliographical references presented by subject.

Legend of the data sheets

☎ **Verification with a specialist by telephone recommended**

Consultation of appendices or bibliographical references recommended

Written description of a specific aspect recommended

Field check recommended

☞ **Reference to an appendix**

See relevant section of the bibliography

See relevant section of Internet references

Example. Step 1, Theme 2

2- *FEDERAL POLICY ON WETLAND CONSERVATION*

Is the project subject to a federal or provincial act or regulation and does it require a permit?

☎ *The Policy deals mainly with federal lands. Consult the regional CWS manager responsible for the policy for further information.* ☞ B

Where necessary, consult the Implementation Guide produced by Environment Canada to apply the policy. We recommend the use of the guide produced by NAWCC for evaluating wetland functions. **1-3**

List of abreviation

CEAA	CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY
RTA	REGIONAL TOURISM ASSOCIATION
JBNQA	JAMES BAY AND NORTHERN QUEBEC AGREEMENT
NAWCC	NORTH AMERICAN WETLANDS CONSERVATION COUNCIL
NEQA	NORTHEASTERN QUEBEC AGREEMENT
COSEWIC	COMMITTEE ON THE STATUS OF ENDANGERED WILDLIFE IN CANADA
SLC	ST. LAWRENCE CENTRE
EAD	ENVIRONMENTAL ASSESSMENT DIVISION, Environment Canada
EPB	ENVIRONMENTAL PROTECTION BRANCH, Environment Canada
EIA	ENVIRONMENTAL IMPACT ASSESSMENT
CEAA	CANADIAN ENVIRONMENTAL ASSESSMENT ACT
EQA	ENVIRONMENT QUALITY ACT, Quebec
MEFQ	DEPARTMENT OF ENVIRONMENT AND WILDLIFE, Quebec
MRN	DEPARTMENT OF NATURAL RESOURCES, Quebec
FPWC	FEDERAL POLICY ON WETLAND CONSERVATION
WAR	WILDLIFE AREA REGULATIONS (Appendix A)
MBR	MIGRATORY BIRDS REGULATIONS (Appendix A)
MBSR	MIGRATORY BIRDS SANCTUARY REGULATIONS (Appendix A)
CWS	CANADIAN WILDLIFE SERVICE
SÉPAQ	SOCIÉTÉ DES ÉTABLISSEMENTS DE PLEIN AIR DU QUÉBEC

List of appendices

APPENDIX A	PERMITS ISSUED BY THE CANADIAN WILDLIFE SERVICE AND THE CANADIAN ENVIRONMENTAL ASSESSMENT ACT
APPENDIX B	RESOURCE PERSONS AT ENVIRONMENT CANADA
APPENDIX C	LIST OF CANADIAN ENVIRONMENTAL ASSESSMENT ACT IMPLEMENTATION GUIDES, PRODUCED BY THE CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY
APPENDIX D	LIST OF DEPARTMENTS AND AGENCIES THAT ADMINISTER STATUTES OTHER THAN THE CANADIAN ENVIRONMENTAL ASSESSMENT ACT
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APPENDIX F	LIST OF BIRD WATCHERS CLUBS IN QUEBEC
APPENDIX G	LIST OF SPECIES AT RISK IN QUEBEC
APPENDIX H	SURVEY TECHNIQUES AND ANALYSIS OF RESULTS
APPENDIX I	COORDINATES OF RELATED ORGANIZATIONS
APPENDIX J	NATURE AND CHARACTERISTICS OF IMPACTS
APPENDIX K	IMPACT ASSESSMENT

1- ACTS AND REGULATIONS

Is the project subject to a federal or provincial act or regulation and does it require a permit?

Is a permit relating to birds required? Does it trigger the Canadian Environmental Assessment Act (CEAA)? Consult the guide produced by the Canadian Wildlife Service (CWS). → 1, A

If a permit is required, contact the Environmental Protection Branch (EPB) or CWS for the PERMIT conditions. → B

If the CEAA applies, Environment Canada must conduct an environmental assessment. Request guidelines. Consult the Environmental Assessment Branch. → B

Check with provincial authorities. → I

2- FEDERAL POLICY ON WETLAND CONSERVATION

Is your project subject to the Federal Policy on Wetland Conservation? What are the policy requirements?

The Policy deals mainly with federal lands. Consult the regional CWS manager responsible for the policy for further information. → B, 2

Where applicable, consult the Implementation Guide produced by Environment Canada in applying the policy. We recommend the use of the guide produced by NAWCC to evaluate wetland functions. → 1

3- CEAA TOOLS

Use the available tools for implementing CEAA.

The Canadian Environmental Assessment Agency distributes a list of the guides it has produced for the application of the Canadian Environmental Assessment Act. → C, 3

4- OTHER PROCESSES

Is the project subject to other environmental assessment processes?
EQA ss. 22 and 31
JBNQA ss. 22 and 23

If other processes apply, there may be opportunities for harmonization. If necessary, consult the departments and agencies responsible for administering the various acts and regulations. → D, 4

Where applicable, list the processes that apply and their requirements. → 2

5- BIRDS, NESTS OR FEATHERS, ETC.

Does the project involve the handling of birds, nests or feathers?

Provide details respecting the locations, methods, quantities, dates, times and disposal techniques, where applicable.

What authorities will be informed of the handling: government departments and agencies, municipalities, police forces, bird watchers clubs, hunting and fishing associations, etc?

1- EXISTING INFORMATION

Gather existing information on birds and bird habitat in the study area.

Consult the information sources of specialized organizations. ☞ E

Consult amateur bird watchers groups and their databases. ☞ F

5

2- EVALUATION OF HABITAT POTENTIAL

What is the potential of the various habitats in the study area? The mapping and description of plant associations is an essential prerequisite.

Using the available information, identify sectors characterized by high concentrations of birds, breeding habitat of species at risk and aspects of particular interest (colonies, expansion of range, restricted distribution, nesting box networks, etc.). 3

Prepare a list of the bird species detected and the species for which there are breeding records in the study area and identify species at risk. ☞ G

4

Identify potential habitat of species at risk and aspects of interest by consulting specialized works, such as the Atlas of Breeding Birds of Quebec. 6

5

3- FIELD CHECKS

If necessary, carry out field checks of the presence of species at risk.

If the options considered affect potential habitat of species at risk, it is recommended that a visit to the site be carried out to verify whether the species is actually using the habitat during one or more seasons.

4- SELECTION CRITERIA FOR OPTIONS

Include appropriate criteria in the grid for selecting the option(s) to be evaluated.

Apply a weighting system that reflects the value of real or potential habitat of species at risk or of particular interest.

Include criteria, such as the relative rarity of a habitat or species in a region and the socioeconomic value of habitats that support activities centered on birds, with or without harvesting.

1- SUFFICIENT INFORMATION?

Is the existing information sufficient for properly characterizing bird habitats and populations?

Information from existing sources of data must make it possible to characterize:

- *breeding bird species;*
- *the use of most important habitats by birds.*

☞ E, F

3

The characterization of breeding birds usually requires a survey. Situations in which existing information is sufficient are rare. Potential habitat of species at risk must always be surveyed.

The existing information must also make it possible to detect the presence of species at risk or species of particular interest.

☞ G

6

2- DEVELOPMENT OF THE SURVEY STRATEGY

The survey strategy is based on the approach taken in Step 2 to optimize the effort to be made.

Select the survey technique(s) to be adopted on the basis of both the habitat and aspects of value in the area in question. Check the approach recommended by Environment Canada in the appendix.

☞ H

Describe the survey strategy and sampling protocol. Where necessary, refer to the specialized works. See the bibliography.

6

In case of doubt, check with the Canadian Wildlife Service.

3- BREEDING BIRD COMMUNITIES

Characterize breeding bird species in each type of habitat affected with the objective of expressing habitat losses in terms of breeding pairs at a later stage.

Conduct the inventories required.

In order to ensure a solid scientific basis for assessing the impacts, we suggest a three-step approach:

☞ H

1- *Evaluation of breeding bird species composition in each habitat type surveyed.*

2- *Evaluation of the density of breeding pairs of the various species in each habitat surveyed.*

3- *Extrapolation of the above information to all habitats affected by the project.*

We propose a uniform approach for the presentation of results.

Always attach detailed resuts of the surveys to the environmental assesment report

Excellent models of such an approach exist. We will suggest a

7

few.

✍ *What are the particular characteristics of the breeding bird communities inventoried? What are the factors that govern them?*

4- OTHER USES OF HABITAT BY BIRDS

Birds use a wide range of habitats during the various stages of their life cycle.

✍ *For what purpose do birds use the study area other than as breeding sites? The existing information is generally sufficient, but it may be necessary to conduct a field check.* ☛ E 3 5

Where required, conduct the necessary inventories.

What is the order of magnitude of the various uses in terms of number of birds, duration, etc? The inventories already conducted and the available databases may provide first-rate information. 3

✍ *What are the particular characteristics of the main uses? Describe the factors governing them.*

1- CONSUMPTIVE ACTIVITIES

Describe and assess the importance of activities involving the harvesting of birds, feathers, nests, etc.

Subsistence hunting. *Associated with Aboriginal cultures and traditional land use. Obtain information from the band council or appropriate authorities. See the references provided.* ☞ I, 8, 7

Sport hunting. *Base the description on first-hand information. Contact outfitters in the study area.* ☞ I

Eiderdown harvesting. *Consult the available documentation on this activity.*

Identify and document all other activities involving harvesting (feathers, nests, eggs, blood samples, etc.). 8

2- NONCONSUMPTIVE ACTIVITIES

Describe and assess the importance of other bird-related activities that do not involve harvesting.

Observation sites. *Check to see whether the study area is often used by amateur bird watchers. Is there an outdoor recreational centre in the vicinity? Consult the local bird watchers club.* ☞ F, 8, 8

Are birds in their natural habitat a ***recreational/tourism attraction*** *on which the local tourism industry depends (inns, cruises, package tours, etc.)? If necessary, contact the regional tourism association.* ☞ I, 9

Is there a protected area nearby? Check with the appropriate authorities. ☞ I, 10

3- SOCIOCULTURAL VALUES

Values associated with history, art, traditions.

Particularly associated with Aboriginal culture. Check with the Department of Indian Affairs and Northern Development or consult with Aboriginal authorities directly. ☞ I, 7

4- PROBLEMS ASSOCIATED WITH BIRDS

Document current problems associated with birds.

Water quality *(e.g., gulls and water in swimming areas)* 9

Damage to property and crops *(e.g., pigeons and buildings, snow geese and crops, gulls in blueberry fields, fish-eating birds and fish farms, etc.)* 10

Safety hazards *(bird strikes)* 11

1- NATURE AND CHARACTERISTICS OF THE IMPACT

Describe the nature and characteristics of the impact, answering the following questions:

- *Does the impact directly affect birds or bird habitat?*
- *Distinguish between short-term impacts (during project implementation) and long-term impacts (following project completion).*
- *Does the impact consist of habitat loss, replacement or disturbance?*
- *What stages of the birds' life cycle will be affected by the impact (breeding, molting, migration, wintering)?*

- *Refer to the explanatory notes.*

☞ J

2A- HABITAT LOSS OR DESTRUCTION

BREEDING

- *Conduct a quantitative assessment of losses of nests, eggs and young birds resulting from the **implementation of the project** .*
- *Express the impacts on habitat **after completion of the project** in terms of breeding pairs. An approach is proposed in Appendix H.*

☞ H

OTHER STAGES

- *Translate habitat losses in terms of bird-day of use by the various species in question.*

2B- HABITAT REPLACEMENT

BREEDING

Note: **By definition, habitat replacement is preceded by habitat loss.**

- *On the basis of existing documentation, describe the changes in breeding bird communities in replacement habitats.*
- *What species will benefit and what species will be disadvantaged?*

OTHER STAGES

- *On the basis of existing documentation, describe the changes in habitat use by birds.*
- *What species will benefit and what species will be disadvantaged? Provide a quantitative order of magnitude of these changes for the main families of birds.*

2C- HABITAT MODIFICATION OR DISTURBANCE

ALL STAGES

- *On the basis of the list provided in the appendix, identify habitat modifications or disturbances resulting from the project.*

☞ K

- *Assess the repercussions of these impacts on the birds.*

2D- DIRECT IMPACTS ON BIRDS

ALL STAGES

- *Describe and conduct a quantitative assessment of the direct impacts on the bird species affected (number of specimens, effects on productivity, etc.).*

3- SIGNIFICANCE OF IMPACTS

The more difficulties the species face, the greater the impact.

- *Evaluate the significance of the impacts on the basis of the precariousness of the species and population trends. Consult specialized works, such as the Atlas of Breeding Birds of Quebec.* 12, 11

4- REPERCUSSIONS ON BIODIVERSITY

The approach suggested above makes it possible to determine avian diversity prior to the project.

- *Will the project reduce or increase avian diversity in the short or long term? Consult the guide produced by the Canadian Environmental Assessment Agency.* C
- *To what extent is the project compatible with the objectives of federal and provincial biodiversity conservation strategies? Consult these strategies and the corresponding action plans.* 13, 12

5- SOCIOECONOMIC IMPACTS

Refer to the uses and characteristics identified in Step 4.

- *Describe and evaluate the socioeconomic impacts of bird fauna. Specify whether the project affects the birds themselves or their activity.* K
- *Describe and evaluate problems that may be caused by birds following a change in their habitat (proliferation of gulls, nuisance, etc.).* 9-11
- *Assess the monetary value of positive and negative socioeconomic impacts.*

6- CUMULATIVE IMPACTS

Under CEAA, cumulative impacts must be taken into account.

- *Determine the spatial and temporal scope of your review of cumulative impacts. Use the available guides.* C, 3
- *Describe and evaluate the importance of the cumulative impacts of the project. The form provided in the appendix proposes a series of questions to guide this evaluation.* L

1- FIRST AND FOREMOST, AVOID IMPACTS

Carry out activities outside critical periods for migratory birds.

- *Avoid activities during critical periods, e.g.:*
  - *clearing plant cover during breeding;*
  - *carrying out activities in areas with high bird concentrations during migration and wintering;*
  - *destruction of rare habitats;*
  - *disturbance of observation or hunting sites during peak periods for these activities.*
- *The Implementation Guide for the Federal Policy on Wetland Conservation proposes an appropriate approach.*

1

2- MITIGATE IMPACTS

Mitigate impacts at the source as much as possible. The consequences can also be mitigated.

- *Did you use the best environmental technologies currently available?*
- *List the precautions and special measures that will be taken to mitigate impacts during project implementation.*
- *What facilities will be targeted for environmental restoration on completion of the work? See the bibliography.*

14

- *Evaluate the impacts of mitigation measures.*
- *Consult the documentation to select the most appropriate bird-scaring technique, if necessary.*

15

3- COMPENSATE FOR ADVERSE ENVIRONMENTAL EFFECTS

The purpose of compensation measures is to recreate, replace or provide equivalent habitat.

- *Are any of the following measures suitable:*
  - *installation of nesting platforms for raptors;*
  - *installation of nesting boxes;*
  - *upgrading of habitats adjacent to or similar to those affected by the project;*
  - *acquisition of equivalent habitats for conservation purposes.*
- *Describe the compensation measures selected and the impacts targeted. Evaluate the impacts of the compensation measures.*

1- REAL SIGNIFICANCE OF IMPACTS

Any uncertainty regarding the nature or significance of an impact should be examined to determine whether follow-up is required.

A follow-up program is advisable in the following circumstances:

you do not know the extent of the problems that could arise concerning the birds;
you do not know what the new breeding bird communities will be;
you are dealing with a rare, threatened or vulnerable species.

? *What are the uncertainties related to impact assessment.*

Consult the guide produced by the Canadian Environmental Assessment Agency on the need for a follow-up program.

☞ C
3

The evaluation of the need for a follow-up program is mandatory in the case of a comprehensive study under CEAA.

2- EFFECTIVENESS OF MITIGATION MEASURES

All untested or new mitigation measures should be monitored to check its effectiveness.

? *Is a follow-up program needed to verify the effectiveness of one or more mitigation measures?*

Consult the guide produced by the Canadian Environmental Assessment Agency on the need for a follow-up program.

☞ C
3

3- COMPONENTS OF THE FOLLOW-UP PROGRAM

Upon completion of its environmental assessment, the responsible authority must inform the public of its follow-up program and of its results when they become available.

Your monitoring program should cover the following aspects:

the problem;
assumptions to be verified;
follow-up conditions:

- *the component of the environment or species monitored*
- *the parameters that will be measured*
- *frequency of operations*
- *analytical and interpretation techniques*
- *anticipated results*

Appendix A

List of permits issued by the Canadian Wildlife Service

PERMITS ISSUED BY THE CANADIAN WILDLIFE SERVICE AND UNDER THE CANADIAN ENVIRONMENTAL ASSESSMENT ACT

Background Document No. 2

Jean-Yves Charette

Environment Canada, Quebec Region
Conservation Branch
Canadian Wildlife Service

March 1995

Appendix A

List of permits issued by the Canadian Wildlife Service

The Canadian Environmental Assessment Act is now in force. Several managers have concerns about the application of the Act. This guide was developed to inform CWS managers responsible for issuing permits of the categories of permits that trigger the Act.

This guide was prepared on the basis of information available at the time of writing. The information contained in this document is subject to change. For further information, we suggest that you refer to the text of the Act and Regulations or consult the environmental assessment officer.

Appendix A

List of permits issued by the Canadian Wildlife Service

This guide was developed to inform Canadian Wildlife Service managers responsible for issuing permits of the categories of permits that trigger the implementation of the Canadian Environmental Assessment Act.

Permits subject to the Act

Not all permits issued by the Canadian Wildlife Service, Quebec Region, under wildlife legislation trigger the Canadian Environmental Assessment Act (CEAA).

The Act is triggered by permits issued under the following regulations:

1. Wildlife Area Regulations (WAR)
   - section 4.

2. Migratory Bird Sanctuary Regulations (MBSR)
   - subsection 9(1).

3. Subsection 4(1) of the Migratory Birds Regulations (MBR)
   - subsection 4(1)
   - section 33
   - paragraph 35(2)(b)
   - section 36

The vast majority of permits issued by the Canadian Wildlife Service in the region concern activities that are considered by the Canadian Environmental Assessment Act to be physical activities. Physical activities that trigger the application of CEAA are identified in the *Inclusion List Regulations*.

With respect to wildlife, the activities described in the Inclusion List are as follows (see *Inclusion List Regulations*, ss. 48 to 55):

- The removal or damaging of vegetation, the carrying on of agricultural activities or the disturbance or removal of soil in a wildlife area that requires a permit under section 4 of the *Wildlife Area Regulations*.

- Physical activities referred to in paragraph 3(2)(b) or subsection 10(1) of the *Migratory Bird Sanctuary Regulations* that require a permit under subsection 9(1) of those Regulations.

- The killing of a migratory bird or the taking of a migratory bird or its nest or eggs that requires a scientific permit referred to in subsection 19(1) of the *Migratory Birds Regulations*.

- The killing of an endangered migratory bird that is considered to be a danger to aircraft operating at an airport that requires a permit under subsection 28(1) of the *Migratory Birds Regulations*.

- The collection of eiderdown from migratory birds that requires a permit under subsection 32(1) of the *Migratory Birds Regulations*.

- The introduction into Canada for the purpose of sport, acclimatization or release from captivity of a species of migratory bird not indigenous to Canada that requires consent in writing under section 33 of the *Migratory Birds Regulations*.

- The deposit of oil, oil wastes or any other substance harmful to migratory birds in waters or in any area frequented by migratory birds that requires an authorization under paragraph 35(2)(b) of the *Migratory Birds Regulations*.

- The killing, capture or possession of any migratory bird or the collection or possession of carcasses, eggs or nests of any migratory bird that requires a special permit under section 36 of the *Migratory Birds Regulations*.

The CWS permits subject to the Canadian Environmental Protection Act are summarized in Tables 1 and 2 of the appendix.

Principal requirements of CEAA

In cases where the Act applies, the manager responsible for issuing the permit must:

1) conduct an environmental assessment or have an environmental assessment conducted as soon as possible before the issuance of the permit . The assessment which will generally take the form of a screening.

2) provide a copy of the environmental assessment report and documents used to prepare it for the public registry.

For further details on the application of CEAA, we suggest that you contact the person responsible for environmental assessments in your service.

Appendix B

Resource persons at Environment Canada

MAILING ADDRESS

Environment Canada
1141 Route de l'Église
P.O. Box 10100
Sainte-Foy, Quebec
G1V 4H5

ENVIRONMENTAL ASSESSMENT DIVISION		
Responsibilities	***Resource persons***	***Tel. No.***
	ANALYSTS	
• Federal impact assessment process • Application of the Canadian Environmental Assessment Act	**Jean-Maurice Coutu**	(418) 648-4857
• Areas of interest of Environment Canada	**Serge Lemieux**	(418) 648-7025
• Questions about this guide	**Serge Lemieux**	(418) 648-7025

CANADIAN WILDLIFE SERVICE - SPECIALISTS		
Responsibilities	***Resource persons***	***Tel. No.***
• Access to migratory bird specialists at CWS	**Jean-Yves Charrette**	(418) 648-7271
• Federal Policy on Wetland Conservation	**Yvon Mercier**	(418) 648-3685
• Environment Canada's protected areas network	**Yvon Mercier**	(418) 648-3685
• Scope of environmental assessments as they pertain to migratory birds	**Jean-Pierre Savard**	(418) 648-3500

PROTECTION BRANCH - REQUIREMENTS RELATED TO PERMITS		
Responsibilities	***Resource persons***	***Tel. No.***
• Acts and regulations administered by Environment Canada • Requirements of permits associated with migratory birds	**Gervais Gagnon**	(418) 648-7020

Appendix C

List of guides produced by the Canadian Environmental Protection Agency

The Canadian Environmental Assessment Agency has prepared background documents and reference guides on various topics related to the *Canadian Environmental Assessment Act*. If necessary, you may consult:

- ***Responsible Authority's Guide, November 1994, 127 pages***

The following reference guides are appended to this document:

  - ➢ ***Addressing Cumulative Environmental Effects***

  - ➢ ***Determining Whether A Project is Likely to Cause Significant Adverse Environmental Effects***

- ***A Guide on Biological Diversity and Environmental Assessment, April 1996***

- ***Cumulative Environmental Effects Annotated Bibliography, October 1996 (available in Internet version only)***

For information, contact the Publications Branch of the Canadian Environmental Assessment Agency:

Canadian Environmental Assessment Agency
Publications Branch
200 Sacré-Coeur Blvd.
Hull, Quebec
K1H 0H3

Tel.: (819) 994-2578

Fax: (819) 953-2891

Website : http://www.ceaa.gc.ca

Appendix D

Departments and agencies responsible for other EA processes

Other federal processes

The environmental and social impact assessment and review process set out in sections 22 and 23 of the James Bay and Northern Quebec Agreement (JBNQA) and the Northeastern Quebec Agreement (NEQA) is administered by the federal administrator. For further information, contact:

Office of the Federal Administrator
Canadian Environmental Assessment Agency
Fontaine Building
200 Sacré-Coeur Blvd.
Hull, Quebec, K1A 0H3
Tel.: (819) 997-1000 / Fax: (819) 994-1469

Provincial processes

The Quebec Department of Environment and Wildlife (MEFQ) is responsible for administering the *Environment Quality Act*. Owing to their nature or location, projects may be subject to a certificate of authorization under s. 22 of the Act. In the case of major projects, the process described in ss. 31.1 *et seq.* of the *Regulation respecting environmental impact assessment and review* may apply. For projects in Northern Quebec, i.e., in territory covered by the James Bay and Northern Quebec Agreement, ss. 154 *et seq.* and ss. 189 *et seq.* of the Act apply.

For information on the requirements of the Act and the provisions that apply to your project, contact the Sustainable Development Branch or the appropriate regional office of MEFQ:

SUSTAINABLE DEVELOPMENT BRANCH

Direction de l'évaluation environnementale des projets industriels et en milieu hydrique Tel.: (418) 521-3933 / Fax: (418) 644- 8222	Direction de l'évaluation environnementale des projets en milieu terrestre Tel.: (418) 521-3900 / Fax: (418) 644- 8222

REGIONAL OFFICES OF MEFQ

Abitibi-Témiscamingue Regional Office Tel.: (819) 762-8154 / Fax: (819) 797-1202	Laval Regional Office Tel.: (514) 662-2616 / Fax: (514) 662-3089
Bas-Saint-Laurent Regional Office Tel.: (418) 727-3511 / Fax: (418) 727-3849	Mauricie-Bois-Francs Regional Office Tel.: (819) 371-6581 / Fax: (819) 371-6987
Chaudière-Appalaches Regional Office Tel.: (418) 386-8000 / Fax: (418) 386-8080	Montérégie Regional Office Tel.: (514) 928-7607 / Fax: (514) 928-7625
Côte-Nord Regional Office Tel.: (418) 964-8888 / Fax: (418) 964-8023	Montreal Regional Office Tel.: (514) 873-3636 / Fax: (514) 873-5662
Estrie Regional Office Tel.: (819) 820-3882 / Fax: (819) 820-3958	Nord-du-Québec Regional Office Tel.: (418) 643-6662 / Fax: (418) 643-2057
Gaspésie-Îles-de-la-Madeleine Regional Office Tel.: (418) 763-3301 / Fax: (418) 763-7810	Outaouais Regional Office Tel.: (819) 771-4840 / Fax: (819) 772-3974
Lanaudière Regional Office Tel.: (514) 654-4355 / Fax: (514) 654-6131	Quebec City Regional Office Tel.: (418) 644-8844 / Fax: (418) 622-3014
Laurentides Regional Office Tel.: (514) 623-7811 / Fax: (514) 623-7042	Saguenay-Lac-Saint-Jean Regional Office Tel.: (418) 695-7883 / Fax: (418) 695-7897

Appendix B

Sources of information of departments and agencies

Component	Nature of data	Geographic coverage	Responsibility
Seabirds	-Location and size of colonies	St. Lawrence River, estuary and gulf	Pierre Brousseau Gilles Chapdelaine, CWS
Endangered species	-Characteristics of 570 breeding sites used by 16 endangered species	Province of Quebec	Pierre Laporte, CWS Michel Huot, MEFQ
Breeding birds	-Presence and status of breeding bird species	Southern Quebec	Yves Aubry, CWS
	-Breeding habitat and conditions	Southern Quebec	Jean-Pierre Savard, CWS
Waterfowl (geese and ducks)	-Questionnaires on catches by sport hunters and Aboriginal hunters -Started in 1967, updated annually	Canada	André Bourget Pierre Dupuis, CWS
	-Banding data -Started in 1900, updated annually	North America	
	-Systematic inventories during breeding season -Started in 1985, updated annually	Quebec	Daniel Bordage, CWS
	-Breeding sites and inventories -Aquatic bird gathering sites	Quebec, sectoral data	Robert Parent, MEFQ
Contamination of bird fauna	-Data on the contamination of bird fauna	Quebec, sectoral data	Jean Rodrigue, CWS

Appendix F

List of amateur bird watcher groups in Quebec

Association québécoise des groupes d'ornithologie	4545 Pierre-de-Coubertin Ave., P.O. Box 1000, Station M, Montreal, Quebec, H1V 3R2
ABITIBI-TÉMISCAMINGUE	
Société du loisir ornithologique de l'Abitibi	P.O. Box 91, Rouyn-Noranda, Quebec, J9X 5C1
Société d'ornithologie du Témiscamingue	P.O. Box 137, Latulipe, Quebec, J0Z 2N0
LOWER ST. LAWRENCE - GASPÉ PENINSULA - MAGDALEN ISLANDS	
Club des ornithologues du Bas-Saint-Laurent	P.O. Box 118, Pointe-au Père, Quebec, G5M 1R1
Club des ornithologues de la Gaspésie	P.O. Box 334, Pabos, Quebec, G0C 2H0
Club d'ornithologie des Îles-de-la-Madeleine	P.O. Box 1239, Cap-aux-Meules, Quebec, G0B 1B0
CHAUDIÈRE-APPALACHES	
Club d'ornithologie Les Amis du Merle-bleu de la Côte-du-Sud	225 Rang 3 West, Sainte-Louise, Quebec, G0R 3K0
COEUR-DU-QUÉBEC	
Société ornithologique du centre du Québec	960 St-Georges Street, Drummondville, Quebec, J2C 6A2
Club des ornithologues de la Mauricie	P.O. Box 21, Grand-Mère, Quebec, G9T 5K7
Club des ornithologues des Bois-Francs	21 Roger Street, Victoriaville, Quebec, G6P 2A8
Club d'ornithologie de Trois-Rivières	P.O. Box 953, Trois-Rivières, Quebec, G9A 5K2
EASTERN TOWNSHIPS	
Société de loisir ornithologique de l'Estrie	P.O. Box 1263, Sherbrooke, Quebec, J1H 5L7
Club des ornithologues de Brôme-Missisquoi	P.O. Box 256, Cowansville, Quebec, J2K 3S7
Club d'observateurs d'oiseaux de la Haute-Yamaska	P.O. Box 813, Granby, Quebec, J2G 8W8
LAVAL-LAURENTIDES-LANAUDIÈRE	
Club d'observateurs d'oiseaux de Laval	3255 Saint-Martin Blvd. East, Suite 215, Laval, Quebec, H7E 5G8
Les observateurs d'oiseaux de la Rivière-du-Nord	1042 Maurice Terrace, Bellefeuille, Quebec, J0R 1A0
Club ornithologique des Hautes-Laurentides	P.O. Box 291, Saint-Jovite, Quebec, J0T 2H0
Club d'ornithologie de la région de Moulin	P.O. Box 239, Terrebonne, Quebec, J6W 3L5
Société d'ornithologie de Lanaudière	P.O. Box 239, Joliette, Quebec, J6E 3Z6

Appendix F

List of amateur bird watcher groups in Quebec

LIST OF AMATEUR BIRD WATCHERS GROUPS IN QUEBEC (CONTINUED)	
MANICOUAGAN	
Club d'ornithologie de la Manicouagan	P.O. Box 2513, Baie-Comeau, Quebec, G5C 2T2
MONTÉRÉGIE	
Club des ornithologues de Châteauguay	15 Maple Blvd., Châteauguay, Quebec, J6J 3P7
Club du loisir ornithologique Maskoutain	2070 Saint-Charles, Saint-Hyacinthe, Quebec, J2T 1V2
Club d'ornithologie de Longueuil	P.O. Box, Jacques-Cartier counter, Longueuil, Quebec, J4J 5J4
Société d'observation de la faune ailée du Sud-Ouest	P.O. Box 27, Saint-Thimothée, Quebec, J0S 1X0
Club d'ornithologie de Sorel-Tracy	P.O. Box 1111, Sorel, Quebec, J3P 7L4
MONTREAL	
Société québécoise de protection des oiseaux	P.O. Box 43, Station B, Montreal, Quebec, H3B 3J5
Club d'ornithologie d'Ahuntsic	P.O. Box 34045, 1221 Fleury East, Montreal, Quebec, H2C 3K4
Société de biologie de Montréal	4777 Pierre-de-Coubertin Ave. Montreal, Quebec, H1V 1B3
OUTAOUAIS	
Club des ornithologues de l'Outaouais	P.O. Box 419, Station A, Hull, Quebec, J8Y 6P2
QUEBEC CITY	
Club des ornithologues de Québec	Domaine de Maizerets, 2000 Montmorency Blvd., Quebec City, Quebec, G1J 5E7
SAGUENAY-LAC-SAINT-JEAN	
Club des ornithologues amateurs du Saguenay-Lac-Saint-Jean	P.O. Box 1265, Jonquière, Quebec, G7S 4K8

Appendix G

Species of birds at risk in Quebec

English name	Scientific name	Robert	COSEWIC	M.O. (1993)
Golden eagle	*Aquila chrysaetos*	V		MDTV
Sharp-tailed sparrow	*Ammodramus caudacutus*			MDTV
Henslow's sparrow	*Ammodramus henslowii*		E	
LeConte's sparrow	*Ammodramus leconteii*			MDTV
Grasshopper sparrow	*Ammodramus savannarum*	V		MDTV
Red-shouldered hawk	*Buteo lineatus*		V	MDTV
Harlequin duck	*Histrionicus histrionicus*		E	MDTV
Great gray owl	*Strix nebulosa*	V		MDTV
Wild turkey	*Meleagris gallopavo*	V		
Cooper's hawk	*Accipiter cooperii*			MDTV
Anatum peregrine falcon	*Falco peregrinus anatum*	V	E	MDTV
Tundra peregrine falcon	*Falco peregrinus tundrius*		V	MDTV
Horned grebe	*Podiceps auritus*	V		MDTV
Red-necked grebe	*Podiceps grisegena*			MDTV
Short-eared owl	*Asio flammeus*		V	
Ivory gull	*Pagophila eburnea*	V	V	MDTV
Cerulean warbler	*Dendroica cerulea*		V	
Louisiana waterthrush	*Seiurus motacilla*		E	
Kirtland's warbler	*Dendroica kirtlandii*	V	V	MDTV
Least bittern	*Ixobrychus exilis*		V	
Flammulated owl	*Otus flammeolus*	V	E	MDTV
Red-headed woodpecker	*Melanerpes erythrocephalus*	E	E	MDTV
Loggerhead shrike	*Lanius ludovicianus migrans*	T		MDTV
Piping plover	*Charadrius melodus*	V		MDTV
Bald eagle	*Haliaeetus leucocephalus*	E	V	MDTV
Yellow rail	*Coturnicops noveboracensis*	T	T	MDTV
Caspian tern	*Sterna caspia*	V		MDTV
Roseate tern	*Sterna dougallii*			MDTV
Rufous-sided towhee	*Pipilo erythrophthalmus*			MDTV
Sedge wren	*Cistothorus platensis*			MDTV

COSEWIC (1997)

ROBERT (1989)

E — *endangered*
"a species facing imminent extirpation or extinction"

V — *vulnerable*
"a species of special concern because of characteristics that make it particularly sensitive to human activities or natural events"

T — *threatened*
"a species likely to become endangered if limiting factors are not reversed"

Appendix G

Species of birds at risk in Quebec

Ministerial Order	MDTV	*may be designated threatened or vulnerable*
Quebec, 1993		

Birds and Environmental Assessments
Survey Techniques and Analysis of Results

Serge Lemieux
Environmental Assessment Division

and

Jean-Pierre L. Savard
Canadian Wildlife Service

Environment Canada
Quebec Region

May 1997

Description of breeding bird communities

Concept

Development projects often result in the destruction or modification of migratory bird habitat. Bird habitat in the sectors affected is either destroyed or modified to such an extent that some species can no longer use it for breeding. In conducting environmental assessments, an attempt must therefore be made to identify those species that will lose their habitat and, in the case of habitat modification, those species that will acquire habitat.

To this end, it is important to know the composition and density of breeding bird populations in each of the main habitat types affected, as well as the composition of breeding bird populations in environments similar to the one in which the project will be carried out, where applicable.

It is then possible to express habitat loss in terms of the number of breeding pairs affected.

With this approach, plant cover in the sectors affected must first be properly described and mapped. The characterization of the bird fauna will be carried out on the basis of these maps.

Sources of information

There are many sources of information on the composition of breeding bird populations in various types of habitat. The list of bibliographical references provides a few sources which might serve as a starting point. Appendix **E** presents sources of data on birds and bird habitat in Quebec. Appendix **F** provides a list of amateur bird watchers groups in Quebec that might be able to provide invaluable information on local bird fauna.

It is important to note, however, that only those works that establish a correlation between densities of breeding pairs and habitat can be used to characterize breeding bird populations in the types of habitat that will be affected by a given project. The results of bird inventories generally provides top-quality information. Major databases, such as that of the *Club des ornithologues du Québec* or the Atlas of Breeding Birds of Southern Quebec, cannot be used to characterize breeding bird populations at a particular site since the data do not take account of habitat. They are very useful, however, for establishing a general picture and can often be used to focus attention on certain species at risk.

Given local variations and the many factors that affect the composition of breeding bird populations in a particular habitat, it is recommended that this characterization be based on field inventories.

Survey techniques

There are several breeding bird survey techniques, each of which has advantages and disadvantages. We will provide a brief overview of the most commonly used techniques. We have also included a number of bibliographical references that describe these techniques and variations on them in detail or that assess their effectiveness.

Total count

This technique consists in systematically counting all pairs, nests, young birds or singing males in the entire study area during the breeding season. The survey should be conducted very early in the morning, when the birds are very active. We recommend at least two visits to the site, spaced at least three weeks apart. This technique is suitable for projects where the affected habitats are small, varied and easily accessible. This technique requires considerable effort, but has the huge advantage of providing a complete picture of the breeding bird populations, without having to extrapolate. The sample plot techniques discussed below can be adapted to conduct a total count.

Sample plot methods

As a general rule, the areas that may be affected by projects are often too large to conduct a total count. A sample plot strategy adapted to the situation is therefore appropriate. The general principle consists in surveying breeding birds on sample plots that are representative of the habitat types affected and extrapolating the results to the entire area affected for each habitat type.

Territory mapping or spot mapping

Territory mapping, also known as spot mapping, consists in surveying birds in a roughly 10-hectare quadrat that is representative of the habitat for which the breeding bird populations are to be characterized. The data collection technique is based on the territorial behaviour of the birds and is designed to outline the territorial limits of the various species that breed in the quadrat. Observations of singing males or interspecies interactions are recorded on a map. A total of 7 to 10 visits are required, however, to obtain a sufficiently accurate picture of the situation. Bibby et al. (1992) discuss variations of this technique. Territory mapping requires considerable efforts, but provides relatively accurate breeding pair densities on the basis of habitat type.

Territory mapping lends is well suited to situations where the area affected is quite large but also relatively homogeneous in terms of habitat diversity.

Point counts

Point counts (Ralph et al. 1993) are particularly suitable for forested environments and rugged terrain. It consists in counting, from a fixed point, the birds seen or heard within an imaginary circle of a fixed or unlimited radius, centered on the observer. A widely used approach consists in collecting data in concentric bands. In wooded environments, we recommend: 0-50 m; 50-75 m and 75 m+. In open areas, it is preferable to add a circle: 0-50 m; 50-75 m; 75-100 m and 100 m+. The duration of counts is 10 minutes. The collection of data by concentric bands permits greater flexibility in the comparison of results with other studies that use a fixed radius of 50 m, 75 m or unlimited. Initially, many observers may have difficulty estimating distances in forest environments; Kepler and Scott (1981, in Ralph et al. 1993) provide advice that will facilitate the estimation of distances. Observers must also be very familiar with the local bird fauna and must be able to identify species by their songs and calls. This method must be used in the spring during the breeding season. It is recommended that the stations be visited at least twice during the breeding season.

This technique is particularly useful for providing relative abundances of the various species present in the habitats inventoried. The results can also be used to calculate densities and can be extrapolated to all habitats affected. This technique, although not as accurate, can be used to approximate the number of breeding pairs of the various

species that could be affected by the project. This is the least costly method for surveying large areas characterized by highly diversified habitat.

A variation of this technique is often used to conduct inventories in marshes. In this case, the point takes the form of a half circle and, due to the increased visibility, a radius of 100 m is used. This variation can also be used in agricultural environmental for inventories conducted along roadsides.

Transect counts

Transect counts, like point counts, are designed to record the maximum number of birds observed rather than to outline territorial limits. This technique consists in moving along a transect line and recording as many birds seen as possible. The observation time per unit area is shorter than with point count techniques because the observer does not remain stationary. However, the areas covered per unit of time are much larger, which makes it possible to increase the sampling effort. Burnham et al.(1980) present a very detailed review and analysis of the different variations of this technique and provide a list of factors that must be taken into consideration. Observer may choose to estimate the distance at which the detected bird is found or, like with point counts, to gather data in successive 25-m bands (0-25 m, 25-50 m, etc.). The number bands depends on the habitat type and visibility.

Particularly suitable for linear projects, transect counts can pose a number of major problems in habitats where moving about is difficult owing to the nature of the vegetation or substrate.

Playback

The objective of this technique is to survey target species that are difficult to detect using standard methods. Playback is used as an aid to the survey technique chosen. Recordings of the calls of target species are played on a portable tape recorder. The target species will often answer almost immediately to recorded calls of their species. The site is visited at the time of day when the target species are most active, generally in the morning or evening. Playback is used to improve the effectiveness of the spot-mapping technique or to more effectively outline the territorial limits of a given species.

Waterfowl survey: counting breeding pairs on the ground

This technique seeks to evaluate the density of breeding duck pairs from inventories carried out on the ground (Bordage et al. 1989). The sample plots are 1 km^2 in area and they can be visited by foot, canoe or other means, depending on the environment. The survey is carried out in the spring, during egg laying or the beginning of incubation. A single visit is made to any given plot during the season. The survey must be carried out during the first five hours of the day.

The CWS has used this technique in several sectors along the St. Lawrence River and estuary and the Saguenay River. The geographic coverage of the inventories varies from region to region, and it is advisable to check with CWS to see whether it has data on the area affected by a given project. This data could be used for purposes of comparisons. It is generally desirable to conduct a new survey, particularly if the data is several years old or if the habitat has since been modified.

Waterfowl survey: counting breeding pairs by helicopter

This method, which is quite costly, is suitable when large areas that are relatively inaccessible are to be inventoried. This method is used each year as part of the Black Duck Joint Venture to survey waterfowl in Eastern Canada and the northeastern United States (anonymous, n.d.). Since the data covers a vast area and is updated annually, the existing data may sometimes be used in environmental assessments of projects.

The survey is carried out in 10 x 10 km plots. In addition to the helicopter pilot, the team consists of one member responsible for navigation and data entry and of one or more observers who locate and count the birds. The observations are made in the spring, at the start of the breeding season. They are made immediately after the migratory species have arrived and established their territories, after the species that do not breed locally have left, and before the males have left their territory following mating. This period ranges from late April to early June, depending on the region.

Choosing a technique

Several factors are taken into account in choosing one or more methods, such as area, habitat diversity and the potential presence of species at risk.

There are several works that provide an overview of the various survey techniques and suggest sampling strategies adapted to different situations. Bibby et al. (1992) provide an excellent review of the techniques used and discuss the assumptions on which each method is based as well as sources of bias.

Other works, such as Ralph et al. (1980), provide a detailed discussion of bird counting techniques and address of specific factors, such as variability in the observers' birding skills.

Analysis and presentation of results

Method

For each type of habitat inventoried, calculate the density of breeding pairs per unit area for each breeding species.

Apply the above information to the areas of the different habitats that will be affected or modified by the project. On the basis of figures obtained, it is possible to determine the species that will be affected by the project.

The results could be presented as follows:

Table 1

Laurentian maple stand			
Area of sample plot: 3.5 hectares		Area affected: 7.0 hectares	
Species	***No. of breeding pairs counted***	***Density of breeding pairs per hectare***	***Total number of breeding pairs affected by the project***
Eastern wood-peewee	2	0.57 (2 pairs/3.5 ha)	3.99 (0.57 X 7.0 ha)
Red-eyed vireo	3	0.86 (3 pairs/3.5 ha)	6.02 (0.86 X 7.0 ha)
Ovenbird	1	0.29 (1 pair/3.5 ha)	2.03 (0.29 X 7.0 ha)

Table 2

Total Number of Breeding Pairs Affected					
Species	***Maple stand***	***Fir stand***	***Alder stand***	***etc.***	***Total***
Eastern wood-peewee	3.99				3.99
Alder flycatcher			4.54		4.54
Swainson's thrush		2.68			2.68
Red-eyed vireo	6.02				6.02
Ovenbird	2.03				2.03
Common yellowthroat			5.32		5.32
American redstart		1.04	2.77		3.81
White-throated sparrow	0.85	3.42			4.27

NOTE: If the point count technique is used, it is important to indicate the radius used to calculate the densities.

Interpretation of results

Description of particular characteristics of resource

Although it is no guarantee of the lack of impacts, the preservation of habitat integrity is generally a good practice in terms of impact mitigation. In this regard, several characteristics of the habitat, populations or bird communities can significantly affect the interpretation of the results and the evaluation of a project's impacts. Although the necessary information will vary depending on the scale of the project and its anticipated impact, particular attention should be focused on the following aspects.

Habitat

- Are the habitats continuous, fragmented or dispersed?
- Can some of the habitats inventoried be considered rare habitats or ecosystems?
- What is their relative abundance in the regional landscape?
- Do they have physical (topography, geology, geomorphology, hydrography) or biological (vegetation) characteristics that may them unique or special?
- Are any of the habitats inventoried covered by a particular conservation or restoration program?
- Do any of the habitats have special status (wildlife area, sanctuary, stop-over)?

Species

- What species are most affected by the project?
- Are there any species at risk among the species inventoried?
- Are any of the species declining in number?
- Are any of the species the focus of special recovery initiatives?
- Have any of the species been identified as priority species under a management program (e.g., the North American Waterfowl Management Plan)?

Species ecology

- What are the characteristics of the distribution of the species affected:

    - sparse distribution
    - at the limit of their range
    - local or regional sub-population
    - colonial species
    - etc.

- Are these species very specific in terms of their choice of habitat? Do they have critical requirements?
- What are the characteristics or factors that affect or govern the presence of particular species in these habitats?
- Are certain habitats unique or the subject of very specific and exclusive use by bird species?
- Do certain habitats contain particular or unique communities?

Appendix I

Coordinates of responsible organizations

Environment and Environmental Assessment

Ministère de l'Environnement et de la Faune du Québec
Direction de la faune et des habitats
150 René Lévesque Blvd. East, 5th Floor
Quebec City, Quebec
G1R 4Y1

Tel.: (418) 644-2823
Fax: (418) 646-6863

Ministère de l'Environnement et de la Faune du Québec
Directions de l'évaluation environnementale en milieu terrestre, des projets industriels et en milieu hydrique et nordique
Marie-Guyart Building, 6th Floor
675 René Lévesque Blvd. East
Quebec City, Quebec
G1R 5V7

Tel.: Milieu terrestre (418) 521-3900
Projets industriels (418) 521-3933
Hydrique et nordique (418) 521-3850
Fax: (418) 644-8222

Aboriginal Affairs

Indian and Northern Affairs Canada
P.O. Box 51127, Postal counter G. Roy
320 St. Joseph Street East
Quebec City, Quebec
G1K 8Z7

Tel.: 1-800-263-5592
Fax: (418) 648-4040

Ministère de l'Environnement et de la Faune du Québec
Direction des affaires intergouvernementales et des relations avec les Autochtones
Marie-Guyart Building, 8th Floor
675 René Lévesque Blvd. East
Quebec City, Quebec
G1R 5V7

Tel.: (418) 643-8209
Fax: (418) 644-4598

Federal Protected Areas

National Parks
Parks Canada
3 Passage du Chien-d'Or, P.O. Box 6060
Quebec City, Quebec
G1R 4V7

Tel.: (418) 648-4042
Fax: (418) 648-5994

Migratory Bird Sanctuaries
Environment Canada
Canadian Wildlife Service
1141 Route de l'Église, P.O. Box 10100
Sainte-Foy, Quebec G1V 4H5

National Wildlife Areas
Environment Canada
Canadian Wildlife Service
1141 Route. de l'Église, P.O. Box 10100
Sainte-Foy, Quebec
G1V 4H5

Tel.: (418) 648-7225
Fax: (418) 649-6475

Tel.: (418) 648-7225
Fax: (418) 649-6475

Provincial Protected Areas

Ecological reserves
Direction de la conservation et du patrimoine écologique
2360 Sainte-Foy, 1st Floor
Sainte-Foy, Quebec
G1V 4H2

Tel.: (418) 643-5397
Fax: (418) 646-6169

Quebec Parks
Direction des parcs québécois
150 René Lévesque Blvd. East, 6th Floor
Quebec City, Quebec
G1R 4Y1

Tel.: (418) 644-9393
Fax: (418) 644-8932

Quebec Wildlife Reserves
Société des établissements de plein air du Québec
Service des ventes et réservations
P.O. Box 1010, Quebec City, Quebec
G1K 8X4

Tel.: (418) 890-6527
Fax: (418) 528-6025

Socioeconomic Aspects

Tourisme Québec (Tourism associations, etc.)
P.O. Box 979
Montreal, Quebec
H3C 2W3

Tel.: 1-800-363-7777
Fax: (514) 864-3838
info@tourisme.gouv.qc.ca
http://www.gouv.qc.ca/tourisme/

Direction des territoires fauniques, de la réglementation et des permis
150 René Lévesque Blvd. East, 4th Floor
Quebec City, Quebec
G1R 4Y1

Tel.: (418) 643-7674
Fax: (418) 528-0834

Types of Impacts

Grid	Impacts on habitat								Impacts on birds	
	LOSS		REPLACEMENT		DISTURBANCE					
Short term (during project implementation)	Breeding		Breeding		Breeding				Breeding	
	Other		Other		Other				Other	
Long term (after completion)	Breeding		Breeding		Breeding				Breeding	
	Other		Other		Other				Other	

Explanatory notes

Term

"Short term" generally refers to the project implementation phase. "Long term" comprises the period from the recolonization of vegetation to a return to relative stability.

Habitat loss

Generally caused by the clearing of vegetation or the destruction of substrate, such as dunes or beaches. Can be followed by long-term replacement or simply result in net habitat loss. Net losses have an overall impact on bird fauna. It is not enough to say that the birds will go elsewhere. The significance of this impact must be evaluated.

Habitat replacement

As a general rule, replacement is preceded by habitat loss during implementation of the project. It is theoretically possible to conceive of short-term replacement. In practice, however, replacement generally occurs after project implementation.

Habitat disturbance

Includes all disturbances of the environment other than a major change to vegetation cover. Contamination by toxic substances is one example. Sometimes, it may be a change in the ecological equilibrium, such as vulnerability to predation, caused by impacts on vegetation, for example.

IMPACTS ON HABITATS AND BIRDS - MODIFICATIONS OR DISTURBANCE

HABITAT MODIFICATION OR DISTURBANCE	• The habitat remains, but its components are modified. This can simply reduce the carrying capacity of the site, or can lead to more significant changes in the ecological equilibrium.	
INTRODUCTION OF PHYSICAL OBSTACLES	• Evaluate the impacts of the modification or disturbance of the physical characteristics of the habitat.	• Increased risk of mortality due to collisions with transmission towers, high voltage lines, wind turbines, office towers. • Barrier effect, changes in land use patterns (high voltage lines, roads, etc.) • Use of installations by birds, e.g., use of transmission towers by raptors for nesting.
CHANGES IN THE AVAILABILITY OF FOOD SOURCES	• Evaluate the impact of competition for food. • Specify whether the competition is intraspecific or interspecific.	• Effects on growth rate, rearing and development of young, time constraints (migration dates). • Search for other food sources, population displacements, damage to property and crops. • Changes in predator-prey relationships.
CLIMATE, WATER REGIME	• The submergence or draining of large areas may result in major changes in local climate. • Changes in water levels, in the times and levels of reservoir filling, increase in turbidity, can result in the same restrictions on habitat use.	• Changes in freeze-up and thaw dates of waterbodies, little or no use of habitats during certain periods. • Higher humidity rate, increased epidemiological risk.
CONTAMINATION BY TOXIC SUBSTANCES	• Distinguish between deliberate discharges and accidental spills. • With respect to accidental spills, discuss the likelihood of occurrence of the risk and describe the emergency response plan, if applicable. • Specify substances, quantities, environmental pathways,	• Pesticide application, discharge of contaminated effluent or landfilling may result in the reintroduction of toxic substances in the environment. • Fuel storage tank leaks, overturned trucks or grounded boats are sources of accidental spills.

	bioaccumula-tion in the food chain, routes of exposure in birds, persistence in the environment and duration of the impact.	

DISTURBANCE	• Specify whether the disturbance is due to:
	  • noise
	  • activity
	  • handling of wildlife
	• Specify whether the disturbance is ongoing, repetitive or episodic.
		• jets, machinery
		• machinery, cars, walkers, ORV
		• research, collection

	• Specify the consequences of the disturbance.	• breakage of family ties, increased predation, etc.

IMPACTS ON RESOURCE USE

CONSUMPTIVE ACTIVITIES		
SUBSISTENCE HUNTING	•	• opening-up of the territory and harvesting by non-Natives • displacement of bird populations from hunting grounds

SPORT HUNTING	• Specify whether the impacts affect:
	  • the resource
	  • activity
	• Specify whether the site has been special status.
		• birds no longer use the site
		• loss of access to the site, loss of the right to hunt.
		• ecological reserve, conservation park.

HARVESTING OF EGGS OR EIDERDOWN	• Specify whether the project has impacts on access to the site or harvesting success, and indicate the factors responsible.	• disturbance, etc.
NON-CONSUMPTIVE ACTIVITIES		

OBSERVATION	• Specify whether the impacts affect:
	  • the resource
	  • activity
	• Specify whether the site has special status.
		• birds no longer use the site
		• loss of access to the site, loss of right to hunt?
		• ecological reserve, conservation park

RECREATIONAL/ TOURISM ACTIVITIES	• Specify whether there is • a loss of the resource • Loss of link between resource and population. • Adverse impacts cause the event to be called into question.	• Example: • white geese no longer use tidal flats • highway on tidal flats • crop damage
CULTURAL VALUE		
HISTORY		
ARTS		
SOCIETY AND TRADITIONS	Does the loss or reduction of the resource threaten an event or tradition that contributes to building group cohesion or preserving of traditional ways of life.	Goose Break

Appendix K
Evaluation of impacts

SOCIOECONOMIC ASPECTS		

EMPLOYMENT	• Specify whether the project creates:
	  • direct jobs
	  • indirect jobs
		• Outfitters, guides, etc.
		• Jobs in the regional hotel industry

REVENUES AND SOCIO-ECONOMIC PROFILE	• Specify the effects on revenues and the indirect impact on the economy.	
	• Specify the scope of the impacts.	• Local, regional economy, etc.

Short Form for the Evaluation of Cumulative Effects

Les Productions Héritage-Biodiversité
for
Environment Canada
Environmental Assessment Division

Environment Canada
Quebec Region

1995

Appendix L
Evaluation of cumulative effects

1) ARE-THERE CUMULATIVE EFFECTS WITH OTHER ACTIVITIES?					
IF SO, SPECIFY	Project duration or	0 - 5 years	5 - 25 years	25 - 100 years	> 100 years
Cumulative effects with impacts of previous projects					
Cumulative effects with future projects					
Both					

Did previous environmental assessments or analyses identify the risks or any significant, beneficial or adverse cumulative effects for this type of project?	YES		NO	
Have these assessments made it possible to identify losses, gains, and the financial resources needed to restore the environmental resource, for the cumulative effects associated with this type of project?	YES		NO	
Does the project have environmental impacts that are considered negligible, but that could be combined with many similar projects or impacts?	YES		NO	

2) WHAT RESOURCE IS MOST AFFECTED BY THE CUMULATIVE EFFECTS?			
BIOPHYSICAL ENVIRONMENT			
a habitat T = terrestrial environment A = aquatic environment W = wetland			
a species A = animal, P = plant		If so, a subpopulation L = local, R = regional	
a community of species			
ATMOSPHERIC ENVIRONMENT			
HUMAN ENVIRONMENT			
N = noise A = aesthetic environment O = odours S = safety and health L = land use			

3) WHAT IS THE NATURE OF THE CUMULATIVE EFFECTS?	
A) CONTAMINATION OF THE ENVIRONMENT	
Atmospheric environment	
3.1 LONG RANGE TRANSPORT OF ATMOSPHERIC POLLUTANTS A = acid depositions, O, T, P = oxidizing, toxic or persistent chemicals	
3.2 AIR QUALITY IN POPULATED AREAS S = urban smog (NOx, VOCs, SOx, etc.) D = dust and other particulates	
3.3 CLIMATE CHANGE O = ozone depleting substances (CFCs, etc.) G = greenhouse gases (CO_2, CH_4, etc.)	

Biophysical environment	
3.4 INCREASE IN THE SEDIMENT, CHEMICAL AND HEAT LOAD OF SURFACE WATERS C = chemical contamination S = suspended sediments or silting W = warming	
3.5 GROUNDWATER O = overutilization, reduction C = contamination	
3.6 CONTAMINATION OF THE ENVIRONMENT AND FOOD CHAIN C = agricultural, silvicultural and horticultural chemicals W = toxic industrial or domestic wastewater T = toxic wastes	
B) SPECIES AND HABITAT LOSS	
3.7 HABITAT LOSS L = loss (construction, draining, cultivation, etc.) D = repeated or ongoing disturbances C = contamination F = fragmentation E = erosion	
3.8 SPECIES LOSS H = habitat loss H = increased harvesting levels C = contamination	
3.9 LOSS OF BIOLOGICAL DIVERSITY G = genetic S = species L = local subpopulation N = national I = international	
C) EFFECTS ON THE HUMAN ENVIRONMENT	
3.10 EFFECTS ON WAY OF LIFE S = structure or social organization C = cultural values U = use and production of resources T = transportation and communications L = Leisure, recreational, tourism and resort activity	
3.11 EFFECTS ON THE ECONOMY AND EMPLOYMENT Number of jobs (L = losses, G = gains) R = revenues and socioeconomic profile Economy (L = local, R = regional, N = national)	

4) ORDER OF MAGNITUDE AND TYPE OF IMPACT			
4.1 TO WHAT EXTENT HAS THE COMPONENT ALREADY BEEN AFFECTED BY PREVIOUS PROJECTS, AT WHAT LEVEL, AND WHAT IS THE SCOPE OF THE IMPACTS?		<5%	Insignificant
		5-20%	Significant
Level L = local R = regional N = national I = international		20-50%	Very significant
		>50%	Major

4.2 IS IT POSSIBLE TO DISCERN A TREND IN TERMS OF CUMULATIVE EFFECTS ON THE RESOURCE?		
In time, , effects + increasingly frequent - less and less frequent = stable		
In terms of area, effects + increasingly significant - less and less significant = equal		
4.3 WHAT IS THE SIZE OF THE AREA AFFECTED BY THE CUMULATIVE EFFECTS, INCLUDING THE PROJECT?		0-1 km
Specify R = radius, of terrestrial or lake environments		1-5 km
D = distance, of river, shoreline		5-20 km
Atmospheric environment L = length of plume, L = average width of plume		>20 km
or Outside the project area		Outside the project area
Human environment L = local R = regional P = provincial N = national I = international		Human environment
4.4 COULD THE SIZE OF THE AFFECTED AREA INCREASE?		
P = by the proposal F = by future projects N = no to both K = Do not know		
4.5 WHAT WOULD BE THE CONTRIBUTION OF THE PROJECT TO THE MEAN ANNUAL CUMULATIVE EFFECT?		
N = negligible (<1%) S = significant (1-10%) V = very significant (>10%) P = more significant than previous projects		
4.6 WHAT IMPACT WOULD THE CUMULATIVE EFFECTS OF THE PROJECT HAVE?		
A = no apparent effect S = same as in the past I = increasing effect, more important than in the past D = discontinuous effects C = synergy, combinations, new impacts		
4.7 FOR THE COMPONENT(S) AFFECTED, IS THERE A THRESHOLD DEFINING THE CARRYING CAPACITY OF THE ENVIRONMENT?		
T = emission or release target C = environmental quality criteria or guideline K = known threshold (lethal or sublethal dose, charge max.) E = endangered, vulnerable or threatened species H = designated or protected habitat		
4.8 WHAT IMPACT WOULD THE PROJECT HAVE ON THE AVAILABLE RESERVE RELATIVE TO THE THRESHOLD?		
N = negligible (<1%) S = significant (1-10%) V = very significant (>10%) D = the project could result in threshold exceedances S = the project could affect the stability of the environment F = like D, but with future projects U = like S, but with future projects		
4.9 WHAT WOULD BE THE EFFECT OF THE PROJECT ON THE REGENERATION CAPACITY OF THE SYSTEM OR RESOURCE?		
R = recovery S = stability, capacity remains the same D = capacity is reduced C = capacity is compromised F = with future projects, capacity would be reduced U = with future projects, capacity would be compromised		
4.10 WHAT IS YOUR OVERALL ASSESSMENT OF THE CUMULATIVE EFFECTS?		
On the basis of the above responses, would the cumulative effects be		

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Section 3 - CEAA Tools - Guides produced by the Canadian Environmental Assessment Agency

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Monitoring / Follow-up Annotated Bibliography
Canadian Environmental Assessment Agency
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Reference Guide: Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects
Reference Guide: The Public Registry
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